

## Research

# A qualitative study of using green marketing practices within Jordanian food companies: a content analysis approach

Rama Mohammad Alzu'bi<sup>1</sup> · Enikő Kontor<sup>2</sup> · Sándor Kovács<sup>3</sup>

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## Abstract

This study explores perceptions, and the current state of using green marketing practices within the Jordanian food companies, an industry where sustainable practices are still emerging. Through qualitative in-depth interviews with 10 industry professionals, insights were gathered on the general strategy, implementation and practices, impact and performance, challenges & barriers, collaboration & industry perspective, and future directions for green marketing in Jordan's food sector, using content analysis process by focusing on the Non-negative matrix factorization, Multiple Correspondence Analysis (MCA) & Moonplots. The findings reveal that two terms "consumer education" and "eco-friendly packaging" consistently emerged in various areas, showing their extensive impact on green marketing strategies within the industry. However, while there is a growing awareness of environmental concerns, and some companies take serious steps toward sustainability, there is still some limited implementation of green marketing initiatives. Thus, to bring out the positive features of green marketing adoption in the Jordanian food sector, a company that show no involvement in sustainability initiatives was excluded from the final analysis. Nevertheless, the study highlights several companies' efforts to follow as an initial step toward sustainability. The research provides valuable implications for policymakers and business leaders in Jordan seeking to foster a more sustainable food industry.

**Keywords** Sustainability · Green marketing · Corporate green practices · Jordanian food industry · Qualitative study · In-depth interviews · Content analysis approach

## 1 Introduction

There is an urgent necessity for reorganizing economic activities, particularly focusing on sustainable growth, in light of the ongoing climate crisis and environmental conditions. In the past few years, the global food industry has experienced a substantial transition, with sustainability becoming its top concern [1]. This shift is being pushed by heightened consumer knowledge of environmental concerns and an escalating demand for products that are environmentally friendly.

The worldwide focus on sustainability has profoundly impacted corporate tactics, establishing green marketing as a crucial method for attaining both environmental and economic goals [2–4]. In the past, green marketing focused mainly on traditional components such as labelling, incentive tactics, and packaging. However, the marketing scenario has

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✉ Rama Mohammad Alzu'bi, rama.alzoubi@econ.unideb.hu; Enikő Kontor, kontor.eniko@econ.unideb.hu; Sándor Kovács, kovacs.sandor@econ.unideb.hu | <sup>1</sup>Faculty of Economics and Business, Doctoral School of Business and Management, University of Debrecen, Böszörményi Str. 138, Debrecen 4032, Hungary. <sup>2</sup>Faculty of Economics and Business, Institute of Marketing and Commerce, University of Debrecen, Böszörményi Str. 138, Debrecen 4032, Hungary. <sup>3</sup>Faculty of Economics and Business, Institute of Sectorial Economics and Methodology, University of Debrecen, Böszörményi Str. 138, Debrecen 4032, Hungary.



transformed, and the environmental aspect has gained considerable importance. Thus, Green marketing incorporates the promotion of environmentally friendly products and practices, including sustainable production methods and business efforts to minimize ecological footprints. Even though some considerable studies have examined green marketing across several industries, its implementation and obstacles in developing nations, require additional investigation [5–7]. The food industry is essential in sustainability concerns, because of its significant environmental impact, characterized by considerable resource use, carbon emissions, and waste production. Several businesses have adopted green marketing techniques including investments in renewable energy, organic certification & sustainable packaging [8]. Nevertheless, empirical research reveals significant barriers, including supply chain inefficiencies, high cost and restricted consumer demand [9]. Although there is plenty of knowledge on green marketing uptake in developed economies, they encounter unique socio-economic and legal hurdles that affect the success of these techniques [10].

Over the past decades, the food market has grown significantly across the globe; as it should have a safer processes and not using synthetic inputs that impact the health and environment negatively [11]. Although green marketing has been thoroughly examined in a number of global contexts, there is still a significant lack of information in the literature about its actual application in developing nations, especially those in the Middle East. In Jordan, the food industry is a crucial sector with major environmental effect, although few studies have studied how food companies embrace and operationalize green marketing approaches. Current research frequently concentrates on theoretical models or consumer impressions. For example, [10] focused on consumer attitudes and purchase intentions while examining the impact of green marketing on sustainable consumer behavior in Jordan. However, little is known about how companies themselves approach green marketing from an operational and strategic standpoint. Also, Jordan demonstrates a significant scenario for analysing the adoption of green marketing. Additionally, there is a significant amount of information to be gained regarding the precise effects of environmentally-friendly activities on the environment, in particular within Jordanian companies [12]. Thus, this study aims to address this gap, and the main focus is on the food industry sector in Jordan. There's many achievement this sector achieved, like based on a report from [13], the food industry is considered one of the most important sectors driving economic development in the Kingdom due to its diverse products and integration with various other economic sectors. Also, in 2019, the overall value of exports amounted to JD530 million, with the Jordanian food industry sector holding a 52 percent share of the local market. This sector plays a crucial role in ensuring food security and driving economic growth, as stated by a spokesperson from the Jordan Chamber of Industry [14]. However, the sector encounters significant sustainability difficulties including, water scarcity, raised energy costs, and ineffective waste management, which are intensified by climate change and population expansion [15]. While sustainability has gained global attention, Jordan's food industry is still in the initial phases of integrating green marketing and sustainable practices. Even though some companies are beginning to implement environmentally friendly initiatives, such as implementing international standards like Jordan Quality Marks (JQM), reducing plastic packaging, sourcing locally, etc. the execution of green marketing strategies in Jordan continues to be limited [16]. Due to challenges like high input costs, lack of incentives, and limited public awareness. Current research on green marketing in Jordan has predominantly concentrated on consumer attitude or broad sustainability practices, with insufficient emphasis on actual industrial challenges & company perspective [10]. Thus, understanding these challenges and opportunities is crucial for encouraging a more sustainable food sector in Jordan. Furthermore, by doing this, it adds new perspectives on the local business world and provides a solid grasp of how green marketing is seen, applied and communicated within this context.

## 2 Literature review

### 2.1 Concept of green marketing

Companies have become the primary drivers of ecological harm due to the rising demand for products and services, as well as the growth of globalization. Due to heightened public consciousness regarding environmental concerns, there is a prevalent tendency among individuals to endorse companies who are dedicated to producing environmentally sustainable products [2]. On the other hand, businesses who disregard these environmental initiatives run the risk of facing operational and economical challenges as well as, frequently, penalty from the government [17]. Therefore, corporations perceived as the root cause of environmental issues have been obliged to reassess their operational methods due to societal pressure. Throughout the historical foundation of green marketing, it had a combination of names like ecology marketing, environmental marketing & sustainable marketing, but there was no universally uniform definition, as ecological awareness is a common element in all definitions [18]. Green marketing (GM) journey started in the late

1980s and early 1990s, in 1975 the American Marketing Association (AMA) defined “green marketing” as the promotion of products presumed to be ecologically safe and friendly [19].

Human demands are endless, whereas resources are limited. Consequently, marketers must employ limited resources efficiently and effectively to meet individual and corporate objectives without depleting excessive resources, and here comes the role of green marketing. Thus, Green marketing (GM) distinguishes itself from traditional marketing by not only addressing customers’ wants and desires but also prioritizing environmental sustainability, in contrast to the profit-driven approach of traditional marketing [20]. Ensuring the sustainability of the natural environment is the primary objective of green marketing. Green marketing is more than just advertising and sales [21]. Nevertheless, the marketing setting has transformed, and the ecological aspect has been more noteworthy. As it is imperative for businesses to actively seek out secure and ecologically sustainable organizational strategies employed to carry out routine activities [22]. According to [23, 24], green marketing defined as a strategic framework for environmental management. It emphasizes the prioritizing of measures that aim to minimize or prevent adverse environmental impacts. The primary objective of this initiative is to improve the effectiveness of product and service distribution by strategically optimizing elements like as planning, location, and pricing. Consequently, green marketing (GM) is a marketing concept that revolves around the organization and incorporation of marketing strategies with the aim of positively influencing consumer preferences, as it encourages individuals to actively participate in the acquisition of ecologically sustainable items [25, 26]. Thus, the term “green marketing” refers to the strategic development and execution of the conventional marketing mix, commonly known as the 4Ps (Product, Price, Place, and Promotion), with the objective of achieving economic objectives while ensuring the exclusion of any environmentally detrimental elements [27]. The Triple Bottom Line (TBL) paradigm, established by [28], supports green marketing by highlighting the incorporation of economic, social, and environmental goals into business strategy. This comprehensive approach guarantees that corporations prioritize not just profits but also their responsibilities towards society and ecological impacts [29].

## 2.2 Green marketing in the food industry

The primary objective of the General Food Law is to guarantee a superior standard of safeguarding human life, animal health and welfare, and the environment [30]. The food industry greatly impacts environmental sustainability through its substantial resource utilization and waste production. Food processing projects encompass the processing and packaging of many food items, including meat products, fish and shellfish, dairy products, fruits and vegetables, cereals, and beverage manufacture. The process includes the enhancement, conservation, and improvement of product quality, as well as the storage, handling, packaging, and canning [31]. Green marketing within the food sector has gained popularity as customers increasingly emphasize sustainability and environmentally conscious consumption. The globally green food market was valued at around USD 428.35 billion in 2022 and is anticipated to attain USD 878.75 billion by 2032, exhibiting a compound annual growth rate (CAGR) of 7.45% throughout this timeframe [32]. Implementing green marketing tactics in this sector involves following practices such as organic agriculture, minimizing food waste, employing eco-friendly packaging, and assuring energy-efficient production methods. These initiatives target environmental issues and serve an expanding demographic of consumers that emphasize sustainability in their buying choices [8, 33]. This increase signifies a substantial transition towards sustainable consumption behaviors among global consumers.

## 2.3 Green marketing in Jordan’s food sector

Jordan a nation marked by scarce natural resources and significant environmental issues, with the use of green marketing methods in the food sector consider both a strategic business decision and an essential component for sustainable growth [34]. The food industry in Jordan encompasses several sub-sectors, such as meat processing and preservation, dairy product manufacturing, canned goods production, soft drink manufacturing, vegetable oil and animal fat production, bakery product manufacturing, cocoa, chocolate, and sugar confectionery manufacturing, and production of other food products [16, 18–20, 22, 23, 25, 27–35]. According to [36], Jordan’s food sector offers prospects for expansion, ingenuity, and job creation. Based on a report from [37] a total of 60,000 employees, predominantly Jordanian nationals, are employed in 2657 food manufacturing establishments across the country. These establishments have produced food products that have contributed to exports worth 558 million dinars in the previous year, accounting for approximately 6% of the gross domestic product (GDP). Also, according to [38], the food market in Jordan is projected to generate revenue of US\$12.73 billion in 2025. The market is projected to expand at an annual rate of 4.93% from 2025 to 2030. However, despite the clear advantages the adaptation of green marketing in the Jordanian food industry remain limited.

Challenges like high manufacturing cost linked to sustainable practices and limited customer awareness and demand for green products frequently dissuade enterprises from adopting environmentally friendly approaches [38]. To illustrate more, a study on Jordanian consumers revealed that although green marketing enhances purchase intentions and brand loyalty, high product pricing and cultural variables may hinder the acceptance of green products [39]. This indicates that economic and socio-cultural barriers must be addressed to effectively foster sustainable customer behavior. Furthermore, the economic diversity within the region indicates that although certain countries possess the financial capacity to engage in green technologies, others may face challenges due to constrained resources & cultural barriers [40, 41]. Consequently, a universal approach may be impractical, necessitating the customization of techniques to align with the unique economic and cultural contexts of each country [42]. Therefore, this study aims to address this gap specifically by exploring 6 main sections (General Strategy, Implementation and Practices, Impact and Performance, Challenges and Barriers, Future Directions & Collaboration and Industry Perspective) faced by the Jordanian food companies in adopting green marketing practices, through a qualitative in-depth interviews with industry professional. This research seeks to provide insights for policymakers and business leaders to foster a more sustainable and competitive food sector in Jordan.

### 3 Methodology

#### 3.1 Study population and sample

The research process began with an extensive effort to gather data on all Jordanian food companies. We identified 33 Jordanian food companies classified under the broader sector of "Food and Drinks Industries."

The six main categories were adapted from [43], as followed:

- Meat and Meat Products (Sausages, Luncheon Meat)
- Frozen and Ready-Made Processed Foods
- Juice and Beverages
- Biscuits, Chocolates, Confectionery, and Ice Cream Products
- Chips and Cornflakes
- Products of Grain Mills and Bakeries

The main reasons for selecting those 6 main categories. Firstly, because of their relevance to green marketing, as the selected categories represent sectors with higher potential for green marketing adoption (e.g., food processing, beverages, and confectionery industries often engage in eco-friendly packaging, sustainable sourcing, etc.) Secondly, within these categories, only medium and large companies were selected, ensuring their representation was proportionate to their presence in the overall sample. Thus, the selected categories include a mix of medium and large enterprises, ensuring a diverse and proportional representation of businesses in the study while keeping the sample size manageable. Thirdly, due to time and resource limitations, focusing on those six categories allowed for a more in-depth analysis, ensuring that the research could be conducted effectively without being overwhelmed by an excessive number of companies. As for the other categories, Dairy products, confections, canned fruits, and sauces were among the first categories examined; unfortunately, their communication tactics lacked sufficient, consistent, or clear green marketing approaches to satisfy the requirements for qualitative content analysis.

The final step in the selection process involved direct outreach, by contacting the companies via email and phone calls to schedule appointments for interviews and data collection.

#### 3.2 Data collection methods

Firstly, in-depth interviews were successfully conducted with middle managers from various departments. All interviews were conducted in person at the respective company headquarters. In total, 10 interviews were completed, representing six large companies and four medium-sized companies. However, one interview was excluded from the analysis due to a negative response from the participant, resulting in a final sample of nine valid interviews.

All interviews were conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects were approved by the Research Ethics Committee at the University of Debrecen, Faculty of

Economics and Business (approval number: GTK-KB 002/2025). Verbal informed consent was obtained from all subjects. Verbal consent was witnessed and formally recorded.

Based on a thorough grasp of the research goals and the background of green marketing in the Jordanian food industry, the authors created the six components that served as a framework for the in-depth interviews. These categories were created to thoroughly capture strategic, operational, and contextual aspects relevant to the application of green marketing strategies rather than being directly adopted from a particular prior research. This method made it possible to explore the many aspects of how businesses see, implement, and prepare for green marketing activities in their particular business environments with flexibility and depth. Furthermore, the structure was carefully aligned with the research questions of the study, to ensure the data collected effectively. A certain amount of guiding questions was added in each area to examine various aspects of green marketing implementation in Jordanian food industries. In particular, there were 4 questions in the General Strategy section, 8 in the Implementation and Practices section, 2 in the Impact and Performance section, 2 in the Challenges and Barriers section, 2 in the Future Directions section, and 3 in the Collaboration and Industry Perspective section. Prior to the interviews, every question was thoroughly examined to make sure it was suitable in meaning, clear in language, and in line with the goals of the study. After being made aware of the study's objectives, participants verbally consented to the researcher recording their interviews for transcription and analysis. The six study variables were categorized as follows for ease of presentation of the results and discussion: V1—General Strategy, V2—Implementation and Practices, V3—Impact and Performance, V4—Challenges and Barriers, V5—Future Directions, and V6—Collaboration and Industry Perspective.

As for the transcription and translation Process The encoding method for the in-depth interviews included multiple systematic stages to guarantee the accuracy and reliability. Firstly, the recorded responses were subsequently transcribed verbatim from the audio recordings. Secondly, the interviews have been translated from Arabic to English. Upon translation, the English version was reviewed and refined to guarantee clarity and consistency with the research context.

Additionally, to facilitate a clear and organized dataset, the finalized set of categories and codes was then provided for further analysis.

### 3.3 Statistical treatment

#### 3.3.1 Non-negative matrix factorization

In the course of the Non-Negative Matrix Factorization (NMF) procedure, authors have analysed the term-document matrix that was constructed from the occurrence of subcategories in each sections studied. Each row in this matrix symbolizes a term (subcategory), while each column signifies a respondent (a given company), and the entry denotes the term's frequency. NMF was applied to the term-document matrix to yield the grouping of the subcategories into clusters (called term clusters). Moreover, respondents (as well as the six sections) could be associated with the most relevant term cluster. To find the appropriate number of clusters (components) in the NMF procedure, three methods (Ward, K-means, and complete linkage) were utilized in the clustering of the term-document matrix prior to the application of NMF. In order to validate the results three cluster quality measures (Silhouette, C-index, Dunn) were utilized in this process.

#### 3.3.2 Multiple correspondence analysis and moonplots

Multiple Correspondance Analysis (MCA) is an extremely useful tool to study the relationships between qualitative data and capture patterns in the dataset geometrically. Simple Correspondance Analysis was first developed by [44], only in order to analyse cross tables of two nominal variables. On the other hand, MCA was also applied as a factor analysis or principal component analysis of qualitative data [45, 46].

In this way, MCA allows the representation of complex datasets of more than two categorical variables as "clouds of points" by locating each variable/objects of analysis in a low-dimensional Euclidean space (generally two dimensions represented by component 1 and 2) [47]. The so called "moon plot" can be created to detect special patterns and clusters. Objects are arranged within a circle so that the ones lie near the origin show similar characteristics to the average pattern with less variance, while objects located far from the origin have unique characteristics with more variance [47]. Therefore, our major goal by the application of the MCA and moonplot was to create a joint map of the mentioned factors and clusters and relate factors to their clusters. MCA was applied on the result of the Non-negative Matrix Factorization.

### 3.3.3 Calculations

All calculations were performed using R 4.2.3. and RStudio 2022.07.2. (Build 576) software's. The term-document matrix (X) was constructed from the pre-processed corpus utilizing the "tm" package. Non-negative matrix factorization was applied using the NMF package. To detect the appropriate number of clusters and validate the results, the "Nbclust" package was employed. MCA analysis was conducted using the "correspond" function in the "MASS" package, while moon plots were generated using the "rhtmlMoonPlot" and "plotrix" packages, saved, and subsequently edited in a support vector graphics format using Inkscape 0.91.

## 4 Results

First the authors present the analysis of the term-document matrix. The most frequently occurred subcategories per section can be seen in Table 1. There are two influential terms: consumer education and eco-friendly packaging that occurred in more than one section (Fig. 1).

Within the framework of moon plots, the "average pattern" is represented by the origin of the circle. Those subcategories that positioned near to each other exhibit similar characteristics and can be grouped together. Subcategories near to the origin of the moon plot, exhibit similar characteristics to the average pattern, and can be less clustered into any groups. In contrast, subcategories, located farther from the origin and closer to the edge of the circle, show distinct attributes and indicate a larger variance from the average pattern. These can be better grouped into different clusters. Based on the factor map of NMF, three clusters can be established (Table 3).

Table 4 shows that which section is characterized by which term cluster the most. It can be seen that the terms belong to the third cluster "Holistic Strategies for Sustainable Development" which describe V1 & V5. The terms of the second cluster "Consumer Engagement & Industrial Collaborative" is related to V4; V6 the most. V2 are best connected to the terms in the first cluster "Sustainable Marketing Practices".

Table 5 shows that which company (respondent) is characterized by which term cluster the most. It can be seen that the terms belong to the third cluster "Holistic Strategies for Sustainable Development" mostly dominates the opinion of two large companies (1 & 6), and two medium companies (5 & 8). The terms of the second cluster "Consumer Engagement & Industrial Collaborative" are related to three large companies (2, 7, 9), and one medium company (3). As for terms in cluster 1 "Sustainable Marketing Practices" can be related mostly to one large company (4).

## 5 Discussion

The interview findings offer significant insights into the implementation of green marketing practices among Jordanian food companies. Firstly, the analysis of the term-document matrix revealed prominent themes and significant concepts across various parts. The examination of the term-document matrix identified the most prevalent subcategories within each part as you can see in Table 1. Notably, two terms "consumer education" and "eco-friendly packaging" consistently emerged in various areas, showing their extensive impact on green marketing strategies within the industry. These findings indicate that companies acknowledge the importance of educating consumers about sustainable options and adopting eco-friendly packaging as essential elements of their green marketing strategies. Moreover, Table 2 identified the most influential categories, consumer education was the most frequently mentioned category (14 Frequency), followed by resource and expertise sharing (10 Frequency) and eco-friendly packaging (9 Frequency). The findings indicate that Jordanian food companies emphasize customer awareness, resource-sharing partnership, and sustainable packaging as fundamental elements of their green marketing strategy. The significance of consumer education fits with prior studies highlighting the importance of consumer awareness in promoting sustainable purchasing behavior [22, 48–50]. Simultaneously, the focus on resource and expertise sharing indicates that businesses acknowledge the imperative of collaboration to overcome obstacles associated with cost and knowledge constraints, an aspect also documented in research on green marketing uptake in developing nations [4]. Finally, the frequent mention of eco-friendly packaging indicates a global trend in which sustainable packaging solutions are progressively gaining a competitive edge [51].

On the other hand, the Moonplot representation of clusters and non-negative matrix factorization (NMF) outcomes offers a visual overview of the interrelations across major subcategories revealed in the analysis. A closer examination of the Moonplot uncovers significant clusters of subcategories, illustrating interconnected elements of green marketing

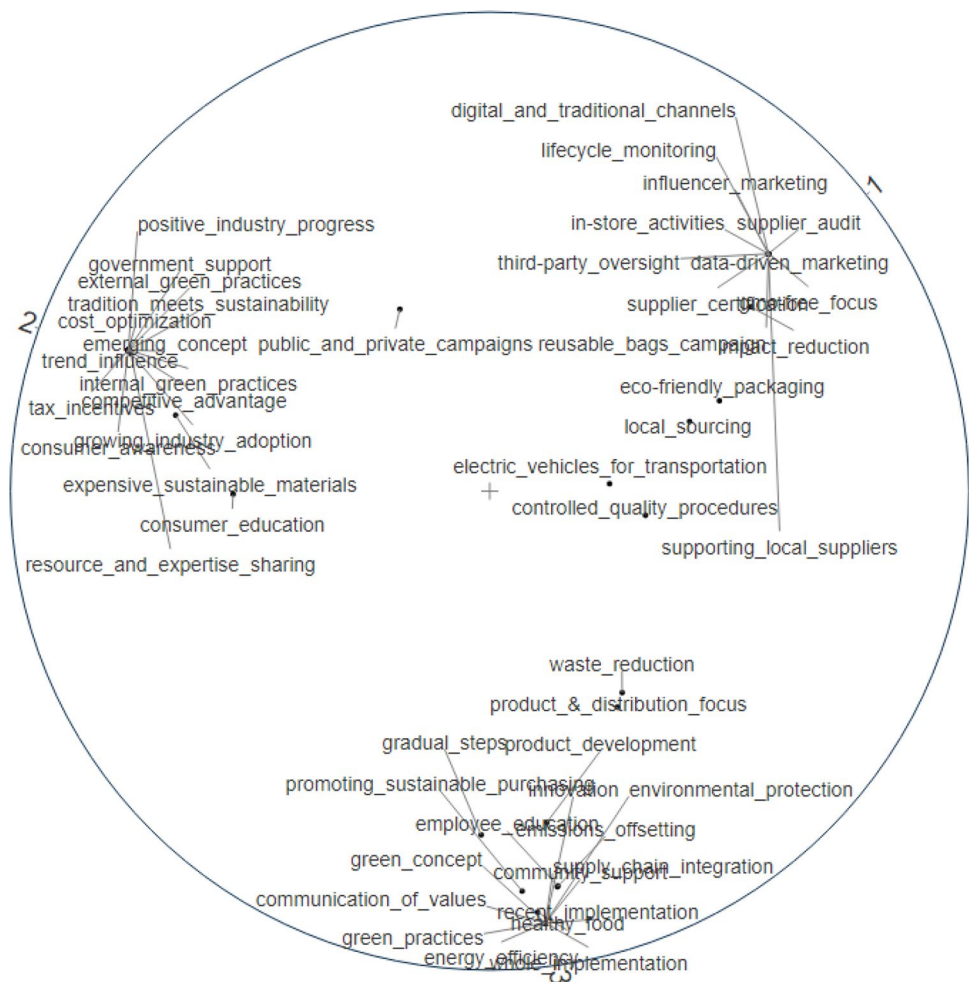
**Table 1** The most common terms in the six sections analyses

Subcategory	Frequency	Section
environmental_protection	7	General Strategy (V1)
communication_of_values	6	
whole_implementation	5	
healthy_food	4	
<b>consumer_education</b>	3	Implementation and Practices (V2)
green_practices	2	
Innovation	2	
<b>eco-friendly_packaging</b>	2	
digital_and_traditional_channels	9	
third-party_oversight	9	
<b>eco-friendly_packaging</b>	5	Impact and Performance (V3)
influencer_marketing	5	
supporting_local_suppliers	5	
brand_perception_shift	9	
increased_revenue	4	
new_consumer_demographic	4	Challenges and barriers (V4)
awards_and_recognition	3	
<b>consumer_education</b>	7	
expensive_sustainable_materials	5	
consumer_awareness	3	Future Directions (V5)
cost_optimization	2	
internal_challenges	2	
brand_integration	5	
interactive_digital_campaigns	4	
emissions_offsetting	3	
waste_reduction	2	
pioneer_in_green_marketing	2	Collaboration, Industry perspective (V6)
<b>eco-friendly_packaging</b>	2	
resource_and_expertise_sharing	9	
emerging_concept	7	
government_support	6	
<b>consumer_education</b>	4	
consumer_awareness	2	
trend_influence	2	
positive_industry_progress	2	

Bold values indicate key themes identified through qualitative analysis, which are critical as they highlight the most frequently discussed factors influencing the adoption of green marketing practices, emphasizing areas where companies can improve sustainability efforts and better align with consumer expectations

implementation within Jordanian food companies. In this regard, “consumer education,” “resource and expertise sharing,” and “eco-friendly packaging” are situated closely together, emphasizing their connected impact on formulating green marketing strategies. This supports the findings from Tables 1 and 2, wherein these subcategories emerged as the most influential elements in the industry. Furthermore, concepts like “waste reduction,” “energy efficiency,” and “green practices” are situated in the margins of the plot, signifying a greater variance in corporate approaches to sustainability initiatives. This division indicates that although these initiatives exist, their execution differs markedly among organizations, potentially because to differences in financial resources, regulatory demands, or market demand. The clustering of “digital and traditional channels,” “influencer marketing,” and “third-party oversight” emphasizes the transforming function of marketing communication methods in the promotion of green products. Companies utilizing digital platforms and third-party certifications may be addressing heightened customer demands for openness and authenticity in sustainability declarations [49, 52–54]. Overall, the Moonplot investigation offers profound insights on the adoption of green

**Fig. 1** Moonplot representation of clusters and non-negative matrix factorization results Source: Own constructions based on moonplot analysis (2025)



marketing strategies by Jordanian food companies, highlighting prevailing strategies, developing trends, and areas of significant variance. These findings illustrate the necessity for focused regulation interventions and cooperative industry initiatives to standardize and improve the efficacy of green marketing.

Building on the insights from the Moonplot visualization, the factor map generated via Non-Negative Matrix Factorization (NMF) enhances the thematic framework of green marketing strategies among Jordanian food companies. The study revealed three separate clusters of phrases, each signifying a particular aspect of sustainability initiatives within the sector, as presented in Table 3. The clusters—Sustainable Marketing Practices, Consumer Engagement & Industrial Collaborative, and Holistic Strategies for Sustainable Development—provide a structured review of the key drivers and obstacles in the adoption of green marketing. Furthermore, Table 4 clarifies the alignment of these clusters with various sections of the study by presenting the average NMF component scores for each segment. Notably, the third cluster, “Holistic Strategies for Sustainable Development” is mostly linked to talks over V1 with an average of (7.13), and V5 with (1.01). This indicates that businesses with a long-term sustainability viewpoint typically prioritize broad, integrative strategies, including systemic policy reforms and cross-sector activities. These findings confirm prior research suggesting that companies with clearly defined sustainability plans are prone to attain long-term competitive advantages [22]. On the other hand, the second cluster “Consumer Engagement & Industrial Collaborative” associated with V4 with an average of (1.98), and V6 with (5.17). This underlines the external pressures, such as legal limits, supply chain interdependence, and competitive dynamics which influence organizations sustainability initiatives. Previous research has shown the importance of industry-wide collaboration in addressing sustainability challenges, especially in developing economies where regulatory assistance may be unreliable [48]. Finally, the first cluster “Sustainable Marketing Practices” is most closely associated with the V2 part with an average of (6.22). This suggests that firms that actively participate in green marketing prioritize tangible operational methods, such environmentally friendly packaging, waste reduction, and sustainable product development. The findings indicate that effective green marketing necessitates a balance between

**Table 2** The most influential categories regarding all sections together

Category	Frequency
consumer_education	14
resource_and_expertise_sharing	10
eco-friendly_packaging	9
digital_and_traditional_channels	9
third-party_oversight	9
brand_perception_shift	9
environmental_protection	7
government_support	7
emerging_concept	7
communication_of_values	6
whole_implementation	5
waste_reduction	5
emissions_offsetting	5
influencer_marketing	5
consumer_awareness	5
expensive_sustainable_materials	5
interactive_digital_campaigns	5
brand_integration	5
healthy_food	4
impact_reduction	4
electric_vehicles_for_transportation	4
local_sourcing	4
supporting_local_suppliers	5
increased_revenue	4
new_consumer_demographic	4
product_&_distribution_focus	3
gradual_steps	3
awards_and_recognition	3
cost_optimization	3

strategic commitment and practical execution, as evidenced by previous research on consumer-driven sustainability programs [49]. The categorization of green marketing aspects into three clusters, along with the factor map and NMF analysis, offers a detailed comprehension of the structural organization of sustainability initiatives in the Jordanian food business. Thus, the findings highlight the need of personalized approaches where organizations must negotiate both internal implementation efforts and external market forces to generate substantial progress in green marketing adoption. On the other hand, in comparative with the developing countries there is an increasing acknowledgment of the necessity for sustainable behaviors [55]. A study in Peru investigated the correlation between green marketing methods and the commercialization of healthful food products. The study, encompassing 133 consumers of a company focused on organic products in Cajamarca, demonstrated a direct and substantial association (0.649) between green marketing initiatives and the effective selling of healthy meals [56]. For instant, in the MENA region, nations such as the United Arab Emirates and Saudi Arabia have launched green marketing initiatives, especially in the energy and construction industries, to conform to their national objectives for sustainable development [57]. However, the degree of green marketing implementation differs throughout the region, shaped by factors including economic stability, governmental assistance, and public awareness.

Building on the thematic cluster analysis, Table 5 presents a company-level perspective, demonstrating which enterprises closely correspond with the detected term clusters. This differential provides vital insights into the approaches particular enterprises within the Jordanian food industry take towards green marketing, further strengthening the distinctions noted in prior investigations. The data reveal that four companies, two of which are large and two of which are medium-sized companies (1, 5, 6, 8) are largely described by phrases from the third cluster “Holistic Strategies for Sustainable Development” This indicates that these companies prioritize future environmental commitments, long-term

**Table 3** Term clusters based on the non-negative matrix factorization components

1. Sustainable marketing practices	2. Consumer Engagement & Industrial Collaborative	3. Holistic Strategies for Sustainable Development
digital_and_traditional_channels	resource_and_expertise_sharing	environmental_protection
third-party_oversight	consumer_education	communication_of_values
eco-friendly_packaging	emerging_concept	whole_implementation
supporting_local_suppliers	government_support	healthy_food
influencer_marketing	consumer_awareness	waste_reduction
impact_reduction	expensive_sustainable_materials	green_practices
local_sourcing	trend_influence	emissions_offsetting
supplier_certification	tax_incentives	Innovation
lifecycle_monitoring	growing_industry_adoption	gradual_steps
supplier_audit	positive_industry_progress	energy_efficiency
data-driven_marketing	external_green_practices	community_support
in-store_activities	internal_green_practices	green_concept
electric_vehicles_for_transportation	public_and_private_campaigns	supply_chain_integration
reusable_bags_campaign	cost_optimization	product_&_distribution_focus
controlled_quality_procedures	competitive_advantage	recent_implementation
gmo-free_focus	tradition_meets_sustainability	promoting_sustainable_purchasing
investing_in_renewable_sources	internal_challenges	employee_education
influencers_marketing	interactive_digital_campaigns	product_development

**Table 4** Average NMF component scores per section and by cluster

Sections	1. Sustainable Marketing Practices	2. Consumer Engagement & Industrial Collaborative	3. Holistic Strategies for Sustainable Development
General Strategy (V1)	0.30	0.47	<b>7.13</b>
Implementation and Practices (V2)	<b>6.22</b>	0.02	0.09
Impact and Performance (V3)	0.07	0.05	0.03
Challenges and Barriers (V4)	0.01	<b>1.98</b>	0.75
Future Directions (V5)	0.37	0.06	<b>1.01</b>
Collaboration, Industry Perspective (V6)	0.01	<b>5.17</b>	0.02

Bold represents the highest component scores per section and by cluster

**Table 5** Average NMF component scores per respondent and by cluster

Respondent	Size of the Company	Sustainable Marketing Practices	Consumer Engagement & Industrial Collaborative	Holistic Strategies for Sustainable Development
1	Large	1.18	1.14	<b>2.21</b>
2	Large	1.48	<b>1.51</b>	1.29
3	Medium	0.98	<b>1.48</b>	1.10
4	Large	<b>1.54</b>	1.41	1.32
5	Medium	1.31	1.31	<b>1.47</b>
6	Large	1.01	1.09	<b>1.70</b>
7	Large	0.93	<b>1.19</b>	1.02
8	Medium	1.03	0.78	<b>1.87</b>
9	Large	1.02	<b>1.73</b>	1.57

Demonstrate the highest enterprises which closely correspond with the detected term clusters

sustainability strategies and policy integration. Firms in this category usually employ a proactive strategy, concentrating on strategic structures and systemic changes instead of temporary operational modifications. Prior research has demonstrated that organizations with a strong strategic sustainability orientation generally obtain superior market positioning and stakeholder loyalty [10]. On the other hand, four companies, three of which are large companies and one is medium-sized companies (2, 3, 7, 9) align most closely with the second cluster “Consumer Engagement & Industrial Collaborative” This indicates that their green marketing strategies are significantly shaped by external factors, including consumer expectations, regulatory compliance, and industry collaboration. These businesses may encounter higher hurdles in fully integrating sustainability because of resource limits or market-driven goals, which coincides with recent research on sustainability adoption barriers in emerging nations [34]. Finally, company 4 (large) is primarily associated with the first cluster “Sustainable Marketing Practices” This shows a larger focus on practical, implementation-driven techniques, such as eco-friendly packaging, direct communication with customers & green product development. This company reflect a hands-on, operational oriented sustainability strategy rather than a broad strategic framework. Such an approach aligns with corporations that consider green marketing as a competitive advantage rather than an ongoing business ideology [58].

## 6 Limitations

While this study gives useful insights on the adoption of green marketing methods among Jordanian food companies, many limitations should be addressed. First, due to the qualitative nature of the study it hard to generalize the results; because of its dependence on interviews and content analysis. Therefore, future research could employ quantitative methodologies or bigger sample sizes to support these findings. Secondly, the study is context-specific, focusing solely on Jordanian food companies, as there’s other sectors that worthy to examine. Also, the swiftly changing nature of green marketing trends poses a problem; as consumer preferences, green practices & regulatory policies are continuously changing. Thus, a longitudinal study could facilitate the monitoring of the evolution of green marketing initiatives over time. Lastly, one should examine the potential biases inherent in self-reported data, since the study depends on interviews with industry executives, there is a chance that respondents may overstate their commitment to green marketing techniques, which cause social desirability bias. Future research should integrate findings, by including customer viewpoints, third-party assessments, for a more objective review.

Despite these limitations, this study presents an essential knowledge of how green marketing is integrated into the Jordanian food industry, setting the way for future research and policy recommendations.

## 7 Conclusion

This study offers a qualitative investigation of Jordanian food companies’ use of green marketing techniques, revealing notable differences in approach, scope, and communication. The results show that whilst some businesses take a proactive and organized approach to sustainability, including environmental principles into their operations and branding, others use green marketing more reactively, motivated by market trends or legal requirements. However, green marketing is still in the early stages for many businesses.

Theoretically, this study adds to the body of literature by providing a local, sector-specific viewpoint on green marketing in the context of developing nations, an area that is still underrepresented in academic research. Additionally, it highlights how institutional, cultural, and resource-based factors influence the adoption and dissemination of green methods, laying the groundwork for further comparative or longitudinal research.

From a practical view point the findings lead to the necessity of clearer green claims, stronger public–private sector cooperation, and more precise national regulations. For companies, building customer trust and satisfying new sustainability standards locally and internationally will require them to invest in internal sustainability skills and match marketing with real environmental performance.

To summarize, these results reflect that green marketing adoption is not uniform among enterprises but differs dependent on strategy orientation, market factors, and resource availability. While some organizations prioritize holistic and long-term sustainability strategies, others are more focused on market-driven adaptability and regulatory compliance. Understanding these variations can help industry leaders and policymakers to take actions that support firms at different levels of adapting green marketing.

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**Data availability** The datasets generated during the current study are available from the corresponding author upon reasonable request.

## Declarations

**Ethics approval and consent to participate** The authors adhere to all ethics as per journal policy, and it conducted following ethical standards, with approval from the appropriate institutional ethics committee. The study obtained ethical approval (approval number: GTK-KB 002/2025) from the Research Ethics Committee of the University of Debrecen, Faculty of Economics and Business. Informed consent was obtained from all participants prior to their participation in the interviews. Verbal consent was audio-recorded and the recording was approved by the participants.

**Consent to publication** I consent to publish this article on behalf of all authors.

**Competing interests** The authors declare no competing interests.

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